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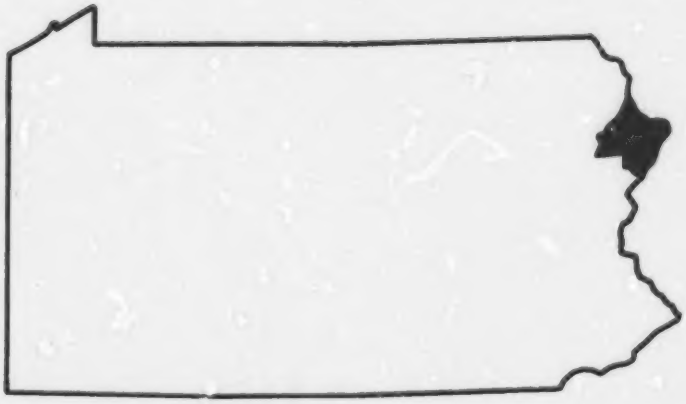
FLOOD INSURANCE STUDY

TOWNSHIP OF GREENE, PENNSYLVANIA
PIKE COUNTY



OCTOBER 18, 1988

COMPLETED

Federal Emergency Management Agency

COMMUNITY NUMBER - 421965

ORIGINAL

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program (NFIP) have established repositories of flood hazard data for floodplain management and flood insurance study purposes. This Flood Insurance Study (FIS) may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

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III

FLOOD INSURANCE STUDY
TOWNSHIP OF GREENE, PIKE COUNTY, PENNSYLVANIA

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the Township of Greene, Pike County, Pennsylvania, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates and assist the community in its efforts to promote sound floodplain management. Minimum floodplain management requirements for participation in the National Flood Insurance Program (NFIP) are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the state (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgments

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study were prepared by the U. S. Army Corps of Engineers (COE), Philadelphia District, for the Federal Emergency Management Agency (FEMA), under Inter-Agency Agreement No. EMW-85-E-1822. This work was completed in December 1986.

1.3 Coordination

In December 1984, an initial Consultation and Coordination Officer's (CCO) meeting was held with representatives of the township, FEMA, and the COE (the study contractor) to identify study methods and sources of basic data.

On November 23, 1987, a final CCO meeting was held with representatives of the township, FEMA, and the study contractor to review the results of the study.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the Township of Greene, Pike County, Pennsylvania. The area of study is shown on the Vicinity Map (Figure 1).

The following streams were studied by detailed methods: East Branch Wallenpaupack Creek, from its confluence with Wallenpaupack Creek to approximately 50 feet upstream of Creek Road; and Wallenpaupack Creek, from approximately 1.9 miles downstream of State Route 507 to approximately 5.8 miles upstream of State Route 507. The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development and proposed construction through December 1991.

The remaining portions of Wallenpaupack Creek and East Branch Wallenpaupack Creek, Wilson Creek, Kintz Creek, Mozette Creek, Taylor Creek, Freeling Run, Sugar Hill Creek, Wilson Swamp, Bridge Creek, Lake in the Clouds, Lake Russel, Lower Lake, Promised Land Lake, Lake Jamie, and Lake Paupack were studied by approximate methods. Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to, and agreed upon by, FEMA and the Township of Greene.

2.2 Community Description

The Township of Greene is located in western Pike County, Pennsylvania. It is bordered on the north by the Townships of Palmyra, Blooming Grove, and Salem; on the east by the Township of Porter; on the south by the Townships of Barrett and Coolbough; and on the west by the Townships of Dreher and Sterling. The township covers an area of approximately 58.5 square miles and in 1982 had a population of 1,522.

The major stream within the township, Wallenpaupack Creek, flows north and forms the western boundary of Greene. East Branch Wallenpaupack Creek, the largest tributary to Wallenpaupack Creek, flows west through relatively steep terrain to its confluence with Wallenpaupack Creek.

The topography of the area is mountainous with scattered swamp lands, lakes, ponds, and numerous mountain streams. Most of the township is undeveloped with residential housing being dispersed through the area.

The climate in this geographic area is characterized by temperatures ranging from an average high of 68 degrees Fahrenheit (^{o}F) in summer and 30^{o}F in winter. The average annual rainfall for the region is 44 inches.

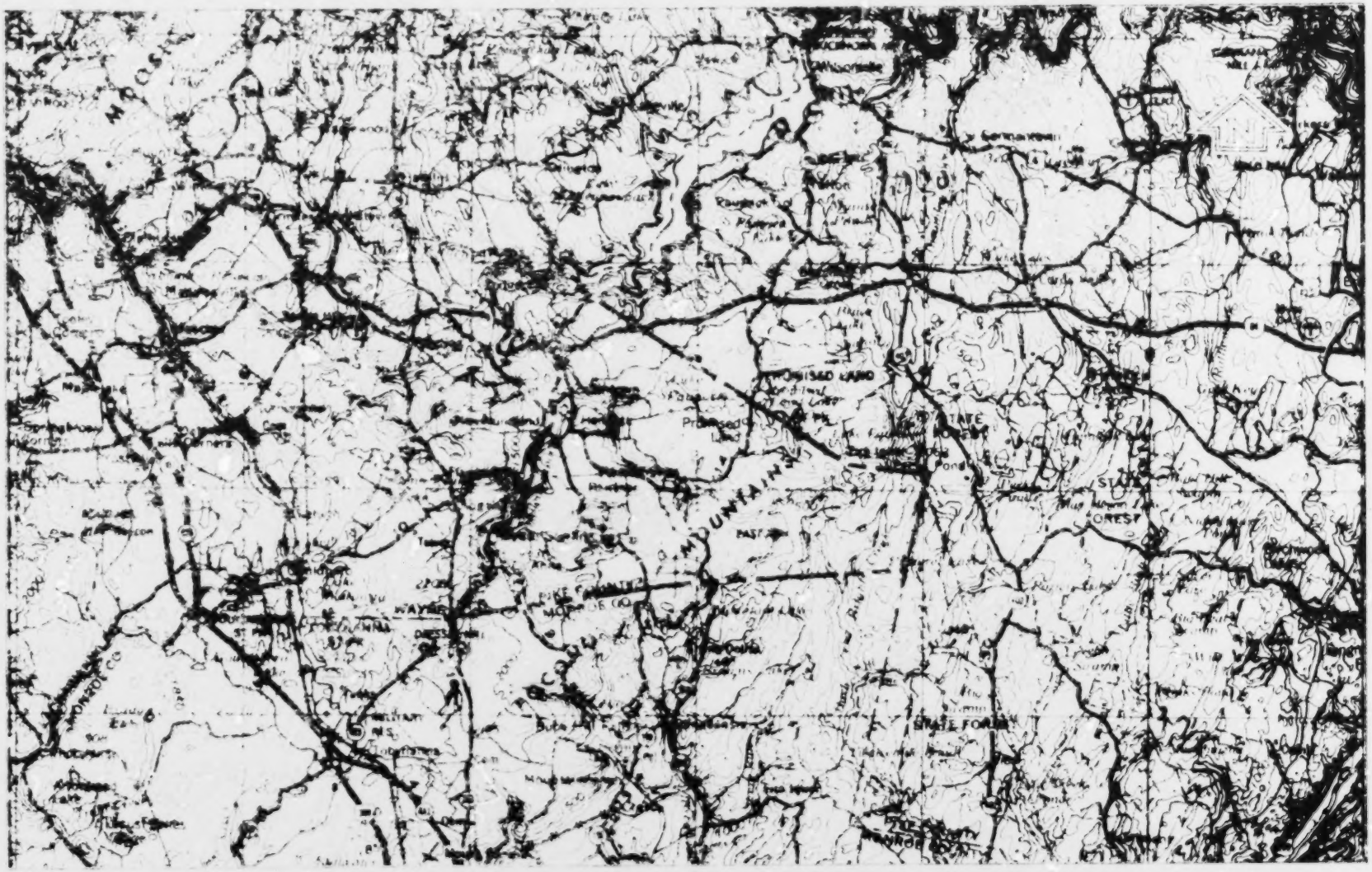

FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWNSHIP OF GREENE, PA

(PIKE CO.)

APPROXIMATE SCALE

0 1/2 1 2 MILES

VICINITY MAP

2.3 Principal Flood Problems

The principal flood problems in Greene are associated with East Branch Wallenpaupack and Wallenpaupack Creek. Little information is available regarding past flooding events; however, in April 1984, heavy rainfall combined with snowmelt caused flooding in the Newfoundland-South Sterling area, which is located in the Township of Dreher.

U. S. Geological Survey (USGS) gages located in Monroe, Wayne, and Pike Counties are analyzed for problems in the area.

2.4 Flood Protection Measures

There are no structural flood protection measures within the township. Residents depend on the usual warnings issued through radio, television, and local newspapers for information concerning possible flood conditions. Flood warnings and predicted flood peaks are issued by the National Oceanic and Atmospheric Administration (NOAA) Flood Forecasting Centers located in the City of Harrisburg, Pennsylvania, and the City of Trenton, New Jersey.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. A flood event of a magnitude which is expected to be equaled or exceeded once on the average during any 100-year period (recurrence interval) has been selected as having special significance for floodplain management and for flood insurance rates. This event, commonly termed the 100-year flood, has a 1 percent chance of being equaled or exceeded during any year. Although the recurrence interval represents the long term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (1 percent chance of annual exceedence) in any 50-year period is approximately 40 percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency and peak elevation-frequency relationships for each flooding source studied in detail affecting the community.

All USGS stream gages with a reasonable number of years of record in Monroe, Wayne, and Pike Counties were analyzed. A flood frequency analysis to determine the 100-year event was performed. This produced records of drainage areas and 100-year flood events that were plotted to generate a regional curve.

A summary of the drainage area-peak discharge relationships for the streams studied by detailed methods is shown in Table 1, "Summary of Discharges."

TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGE (cfs) 100-YEAR
EAST BRANCH WALLENPAUPACK CREEK		
At confluence with Wallenpaupack Creek	33.9	4,720
Downstream of Creek Road	17.5	2,470
WALLENPAUPACK CREEK		
Downstream of confluence of East Branch Wallenpaupack Creek	69.1	9,480
Upstream of confluence of East Branch Wallenpaupack Creek	31.3	4,360
Upstream of confluence of Freeling Run	13.7	1,945

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

Cross sections for the backwater analysis of the detailed study streams were photogrammetric or field surveyed and were located at close intervals above and below bridges and culverts in order to compute the significant backwater effects of these structures (Reference 1). The ground control for the photogrammetry was acquired using inertial surveying techniques (Reference 2).

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1) and the Flood Insurance Rate Map (Exhibit 2) where applicable.

Water-surface elevations of floods of the selected recurrence intervals were computed using the COE HEC-2 step-backwater computer program (Reference 3). The results of the water-surface elevations are tabulated for selected cross sections (Table 2). Flood profiles were drawn showing computed water-surface elevations for floods of the selected recurrence intervals.

Starting water-surface elevations for the streams studied in detail were obtained from backwater computations at the respective confluences or from normal depth calculations, as appropriate.

Channel and overbank roughness factors (Manning's "n") used in the hydraulic computations were chosen by engineering judgment and were based on field observations of the stream and floodplain areas (Reference 4). The channel "n" value for streams studied by detailed methods was 0.045 and the overbank "n" value was 0.090.

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD). Elevation reference marks used in this study are shown on the maps; the descriptions of the marks are presented in Elevation Reference Marks (Exhibit 3).

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The NFIP encourages State and local governments to adopt sound floodplain management programs. Therefore, each Flood Insurance Study provides 100-year flood elevations and delineations of the 100-year floodplain boundaries to assist communities in developing floodplain management measures.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1 percent annual chance (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. For the streams studied in detail, the 100-year floodplain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:24,000 with a contour interval of 20 feet (Reference 5).

For those flooding sources studied by approximate methods, flood boundaries were delineated using the Flood Hazard Boundary Map for the Township of Greene (Reference 6).

FLOODING SOURCE		STREAM CHANNEL			LEFT OVERBANK			RIGHT OVERBANK			100 YEAR FLOOD WATER SURFACE ELEVATION
CROSS SECTION	DISTANCE (FT.)	WIDTH (FT.)	DISCHARGE (CFS)	MEAN VELOCITY (FT./SEC.)	WIDTH (FT.)	DISCHARGE (CFS)	MEAN VELOCITY (FT./SEC.)	WIDTH (FT.)	DISCHARGE (CFS)	MEAN VELOCITY (FT./SEC.)	
A	650	50	900	6.6	235	3820	4.3	0	0	0.0	1304.1
B	1525	45	4060	13.9	40	370	4.3	20	290	4.2	1320.2
C	3400	50	2920	12.8	195	1420	5.0	40	380	4.2	1339.8
D	4775	65	4020	4.6	245	40	1.8	50	660	2.8	1352.6
E	6175	55	1850	10.0	215	2820	4.6	10	50	3.0	1363.5
F	7275	35	2540	10.5	70	750	3.3	165	1430	3.4	1374.9

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

Township of Greene
Pike County
Pennsylvania

REGULATORY DATA

East Branch Wallenpaupack Creek

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FLOODING SOURCE		STREAM CHANNEL			LEFT OVERBANK			RIGHT OVERBANK			100 YEAR FLOOD WATER SURFACE ELEVATION
CROSS SECTION	DISTANCE (FT.)	WIDTH (FT.)	DISCHARGE (CFS)	MEAN VELOCITY (FT./SEC.)	WIDTH (FT.)	DISCHARGE (CFS)	MEAN VELOCITY (FT./SEC.)	WIDTH (FT.)	DISCHARGE (CFS)	MEAN VELOCITY (FT./SEC.)	
A	0	80	6960	8.6	110	1690	2.9	60	830	2.7	1277.8
B	1950	75	4880	7.0	75	1060	2.6	205	3540	2.8	1283.5
C	3925	80	7060	10.1	115	1750	3.5	105	680	3.1	1291.4
D	6325	120	8900	7.7	20	190	2.2	35	390	2.4	1299.8
E	7800	50	1950	3.4	160	790	1.1	600	1620	0.8	1302.5
F	9075	35	1010	2.8	675	3180	0.9	250	170	0.7	1303.0
G	9900	30	1470	4.4	475	1630	1.2	260	1250	1.2	1303.3
H	11025	35	540	1.5	1130	3120	0.5	600	700	0.4	1307.4
I	12150	45	1130	2.8	1260	2750	0.7	325	490	0.7	1307.6
J (1)	13525	105	2580	8.5	260	950	3.1	580	310	1.6	1308.6
K (1)	14875	75	3340	9.0	955	500	2.4	510	(2)	(2)	1315.2
L (1)	15950	160	3840	3.9	600	(2)	(2)	0	0	0.0	1321.2
M	16600	70	3720	12.1	0	0	0.0	10	120	3.9	1323.5
N (1)	18125	115	3840	6.0	365	(2)	(2)	130	0	0.0	1335.2
O (1)	19650	50	2990	12.9	460	(2)	(2)	45	840	5.6	1344.5
P (1)	20475	130	3440	5.4	930	(2)	(2)	85	400	2.1	1351.9
Q (1)	21525	140	2580	8.6	100	1250	3.6	350	(2)	(2)	1357.7

(1) Topwidth adjusted due to ineffective flow areas. (2) Data not available due to topwidth adjustment.

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

Townshp of Greene
Pike County
Pennsylvania

REGULATORY DATA

Wallenpaupack Creek

FLOODING SOURCE		STREAM CHANNEL			LEFT OVERBANK			RIGHT OVERBANK			100 YEAR FLOOD WATER SURFACE ELEVATION
CROSS SECTION	DISTANCE (FT.)	WIDTH (FT.)	DISCHARGE (CFS)	MEAN VELOCITY (FT./SEC.)	WIDTH (FT.)	DISCHARGE (CFS)	MEAN VELOCITY (FT./SEC.)	WIDTH (FT.)	DISCHARGE (CFS)	MEAN VELOCITY (FT./SEC.)	
R (1)	23625	120	2320	6.1	60	200	2.4	490	(2)	(2)	1379.2
S (1)	25050	155	2470	7.1	10	60	2.6	185	(2)	(2)	1388.8
T	26750	35	1620	11.0	75	360	3.1	45	550	4.3	1404.8
U	28900	35	520	6.5	160	630	2.7	230	790	2.7	1431.6
V	30600	60	1930	8.4	0	0	0.0	25	10	1.6	1450.8
W	32650	10	590	10.6	10	70	3.0	75	1290	4.5	1479.5
X	33500	35	1590	10.0	30	300	3.5	10	60	2.8	1488.9
Y	34525	40	1820	11.5	0	0	0.0	15	130	3.9	1508.2
Z	35550	25	1660	13.2	15	180	4.0	10	110	3.8	1529.0
AA	36875	10	640	13.4	5	40	3.6	45	750	5.4	1546.6
AB (1)	37775	40	1340	7.9	330	(2)	(2)	15	90	2.6	1559.9
AC	38850	35	1250	10.1	20	120	3.2	15	70	3.1	1572.6
AD	40825	30	830	7.4	60	470	3.1	30	130	2.3	1596.0

(1) Topwidth adjusted due to ineffective flow areas. (2) Data not available due to topwidth adjustment.

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

Townshp of Greene
Pike County
Pennsylvania

REGULATORY DATA

Wallenpaupack Creek

The 100-year floodplain boundaries are shown on the Flood Insurance Rate Map (Exhibit 2). On this map, the 100-year floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A and AE). Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the National Flood Insurance Program, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 100-year floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights. Minimum federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced.

The area between the floodway and 100-year floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood by more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 2.

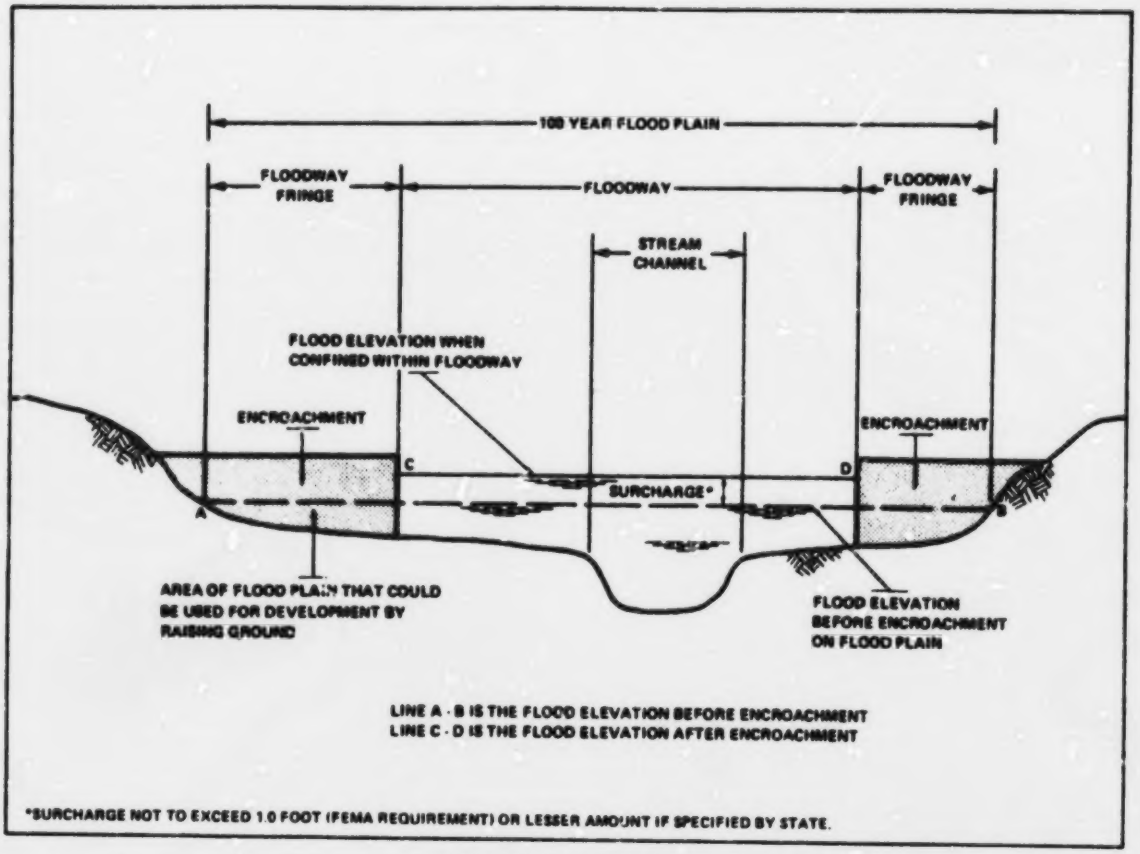
No floodways were calculated as part of this study.

5.0 INSURANCE APPLICATION

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. These zones are as follows:

Zone A

Zone A is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base flood elevations or depths are shown within this zone.


100 YEAR FLOOD PLAIN
FLOODWAY FRINGE
FLOODWAY
FLOODWAY FRINGE
STREAM CHANNEL
FLOOD ELEVATION WHEN CONFINED WITHIN FLOODWAY
ENCROACHMENT
ENCROACHMENT
C
D
A
SURCHARGE*
AREA OF FLOOD PLAIN THAT COULD BE USED FOR DEVELOPMENT BY RAISING GROUND
FLOOD ELEVATION BEFORE ENCROACHMENT ON FLOOD PLAIN
LINE A - B IS THE FLOOD ELEVATION BEFORE ENCROACHMENT
LINE C - D IS THE FLOOD ELEVATION AFTER ENCROACHMENT
*SURCHARGE NOT TO EXCEED 1.0 FOOT (FEMA REQUIREMENT) OR LESSER AMOUNT IF SPECIFIED BY STATE.

FLOODWAY SCHEMATIC Figure 2

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by detailed methods. In most instances, whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AH

Zone AH is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AO

Zone AO is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-foot depths derived from the detailed hydraulic analyses are shown within this zone.

Zone A99

Zone A99 is the flood insurance rate zone that corresponds to areas of the 100-year floodplain that will be protected by a Federal flood protection system where construction has reached specified statutory milestones. No base flood elevations or depths are shown within this zone.

Zone V

Zone V is the flood insurance rate zone that corresponds to the 100-year coastal floodplains that have additional hazards associated with storm waves. Because approximate hydraulic analyses are performed for such areas, no base flood elevations are shown within this zone.

Zone VE

Zone VE is the flood insurance rate zone that corresponds to the 100-year coastal floodplains that have additional hazards associated with storm waves. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the 500-year floodplain, areas within the 500-year floodplain, and to areas of 100-year flooding where average depths are less than 1 foot, areas of 100-year flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 100-year flood by levees. No base flood elevations or depths are shown within this zone.

Zone D

Zone D is the flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible.

6.0 FLOOD INSURANCE RATE MAP

The Flood Insurance Rate Map is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 100-year floodplains that were studied by detailed methods, shows selected whole-foot base flood elevations or average depths. Insurance agents use the zones and base flood elevations in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens, and symbols, the 100-year floodplain. The locations of selected cross sections used in the hydraulic analyses are shown where applicable.

7.0 OTHER STUDIES

Flood Insurance Studies for the Townships of Palmyra, Blooming Grove, Salem, Porter, Coolbough, and Sterling have been prepared (References 7, 8, 9, 10, 11, and 12). The results of this study are in complete agreement with the results of those studies.

Flood Insurance Studies are currently being prepared for the Townships of Barrett and Dreher (References 13 and 14). The results of those studies will be in complete agreement with the results of this study.

Due to its more detailed nature, this study supersedes the Flood Hazard Boundary Map for the Township of Greene (Reference 6).

8.0 LOCATION OF DATA

Information concerning the pertinent data used in preparation of this study can be obtained by contacting FEMA, the Natural and Technological Hazards Division, Liberty Square Building (Second Floor), 105 South Seventh Street, Philadelphia, Pennsylvania 19106.

9.0 BIBLIOGRAPHY AND REFERENCES

1. Aerial Data Reduction Associates, Inc., Aerial Photogrammetric and Field Surveys of Monroe, Wayne, and Pike Counties, Pennsylvania, Pennsauken, New Jersey, September 1985-January 1986.

2. Nortech Surveys Inc., Report on the Federal Emergency Management Agency Project, Inertial Elevation Survey for United States Army Corps of Engineers for Aerial Data Reduction Associates Inc., October-November 1985.

3. U. S. Army Corps of Engineers, Hydrologic Engineering Center, HEC-2 Water Surface Profiles, Users Manual, Davis, California, April 1982.

4. Ven Te Chow, Open-Channel Hydraulics, New York, McGraw-Hill, 1959.

5. U. S. Department of the Interior, Geological Survey, 7.5-Minute Series Topographic Maps, Scale 1:24,000, Contour Interval 20 Feet: Newfoundland, Pennsylvania 1966, Photorevised 1973.

6. U. S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Hazard Boundary Map, Township of Greene, Pike County, Pennsylvania, February 21, 1975.

7. U. S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Insurance Study, Township of Palmyra, Wayne County, Pennsylvania, Washington, D. C., March 15, 1977.

8. Federal Emergency Management Agency, Federal Insurance Administration, Flood Insurance Study, Township of Blooming Grove, Pike County, Pennsylvania, Washington, D. C., November 16, 1979.

9. U. S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Insurance Study, Township of Salem, Wayne County, Pennsylvania, Washington, D. C., November 29, 1974.

10. Federal Emergency Management Agency, Flood Insurance Study, Township of Porter, Pike County, Pennsylvania, Washington, D. C., October 15, 1985.

11. U. S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Insurance Study, Township of Coolbough, Monroe County, Pennsylvania, Washington, D. C., November 26, 1976.

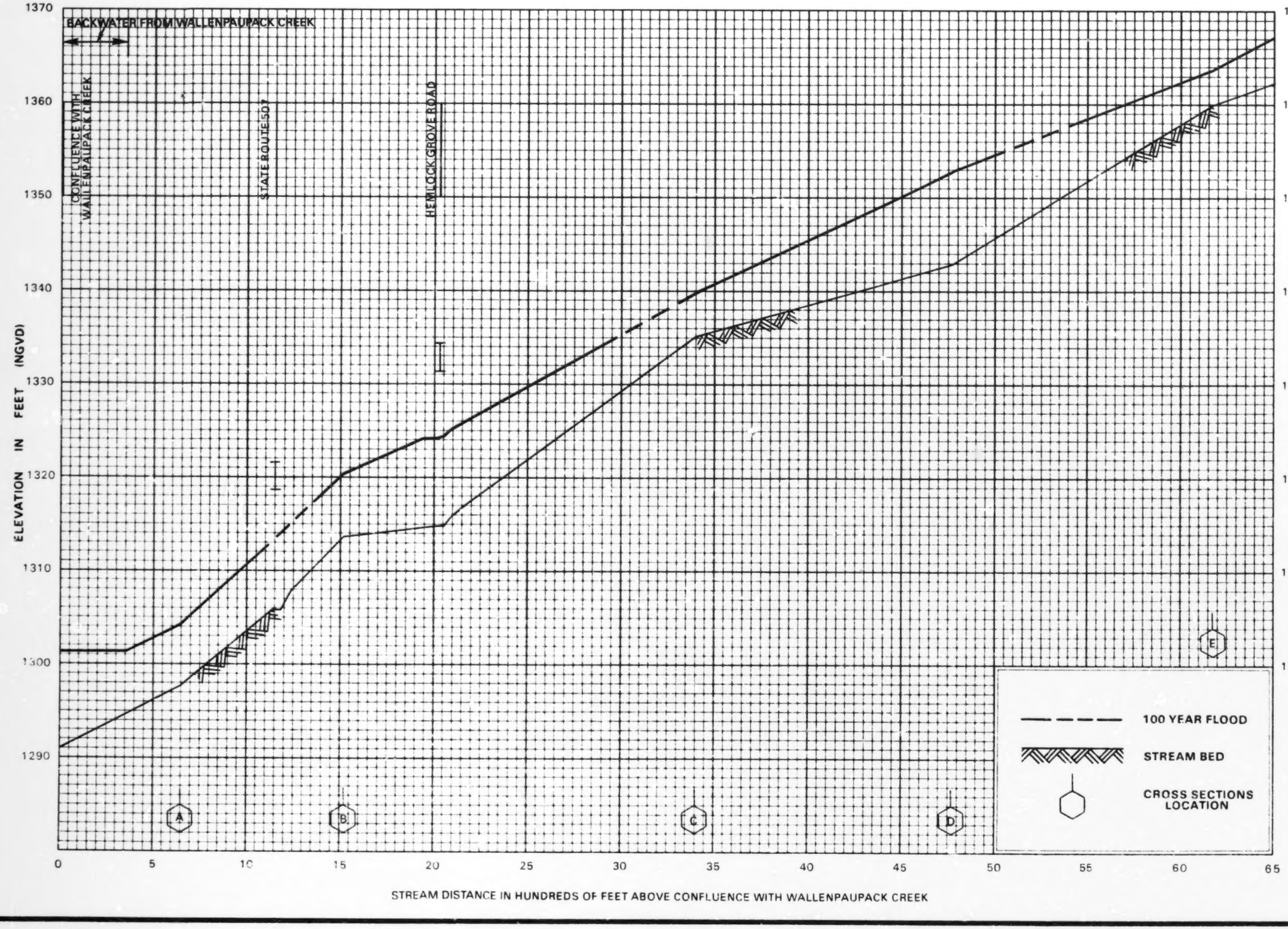
12. Federal Emergency Management Agency, Flood Insurance Study, Township of Sterling, Wayne County, Pennsylvania, Washington, D. C., December 3, 1982.

13. Federal Emergency Management Agency, Flood Insurance Study, Township of Barrett, Monroe County, Pennsylvania (Unpublished).

14. Federal Emergency Management Agency, Flood Insurance Study, Township of Dreher, Wayne County, Pennsylvania (Unpublished).

EXHIBIT 3 - ELEVATION REFERENCE MARKS

Reference Mark	FIRM Panel	Elevation (Feet NGVD)	Description of Location
RM 1	10	1,324.13	Square cut at southwest corner of State Route 507 bridge at abutment.
RM 2	10	1,336.47	Square cut at south corner of Hemlock Grove Road bridge at abutment.
RM 3	10	1,386.08	Square cut at south corner of Creek Road bridge at abutment.
RM 4	10	1,313.09	Square cut at west corner of State Route 507 at abutment.
RM 5	10	1,318.96	Square cut at north corner of Panther Road bridge at abutment.
RM 6	10	1,344.87	Square cut at northwest corner of Mountain View Road at abutment.
RM 7	25	1,399.41	Square cut at north corner of concrete deck of Private Road bridge at abutment.
RM 8	25	1,472.31	Square cut at north corner of Pine Grove Road bridge at abutment.
RM 9	25	1,539.47	PK nail at north corner of Private Road bridge deck at abutment.



FLOOD PROFILES

EAST BRANCH WALLENPAUPACK CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWNSHIP OF GREENE, PA
(PIKE CO.)

01P

ELEVATION IN FEET (NGVD)

1360 1370 1380 1390

65 70 75 80 85

STREAM DISTANCE IN HUNDREDS OF FEET ABOVE CONFLUENCE WITH WALLENPAUPACK CREEK

F

CREEK ROAD

LIMIT OF DETAILED STUDY

100 YEAR FLOOD

STREAM BED

CROSS SECTIONS LOCATION

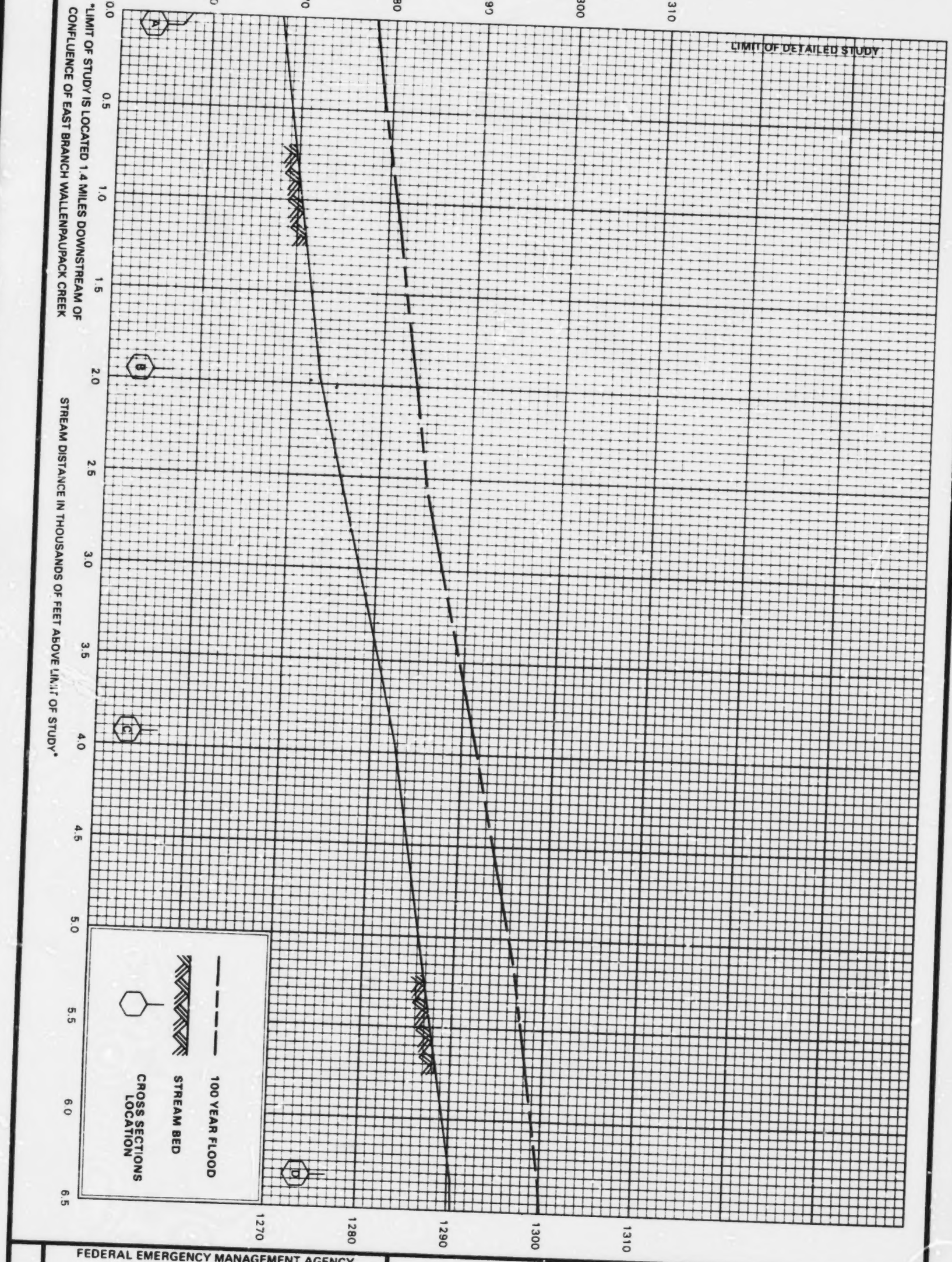
FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWNSHIP OF GREENE, PA
(PIKE CO.)

02P

FLOOD PROFILES

EAST BRANCH WALLENPAUPACK CREEK



FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWNSHIP OF GREENE, PA
(PIKE CO.)

FLOOD PROFILES

WALLENPAUPACK CREEK

03P

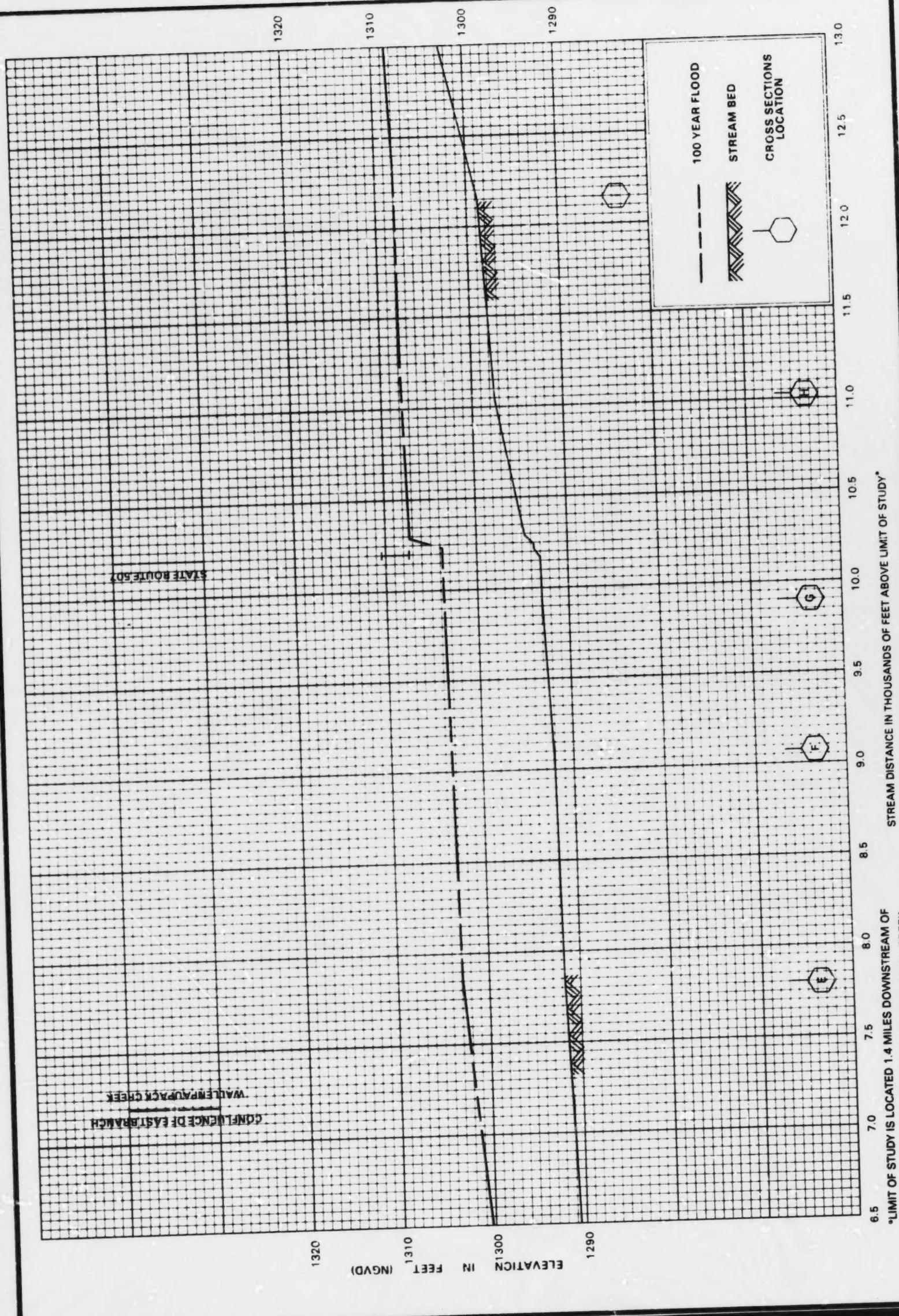
FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWNSHIP OF GREENE, PA
(PIKE CO.)

04P

FLOOD PROFILES

WALLENPAUPACK CREEK



*LIMIT OF STUDY IS LOCATED 1.4 MILES DOWNSTREAM OF CONFLUENCE OF EAST BRANCH WALLENPAUPACK CREEK

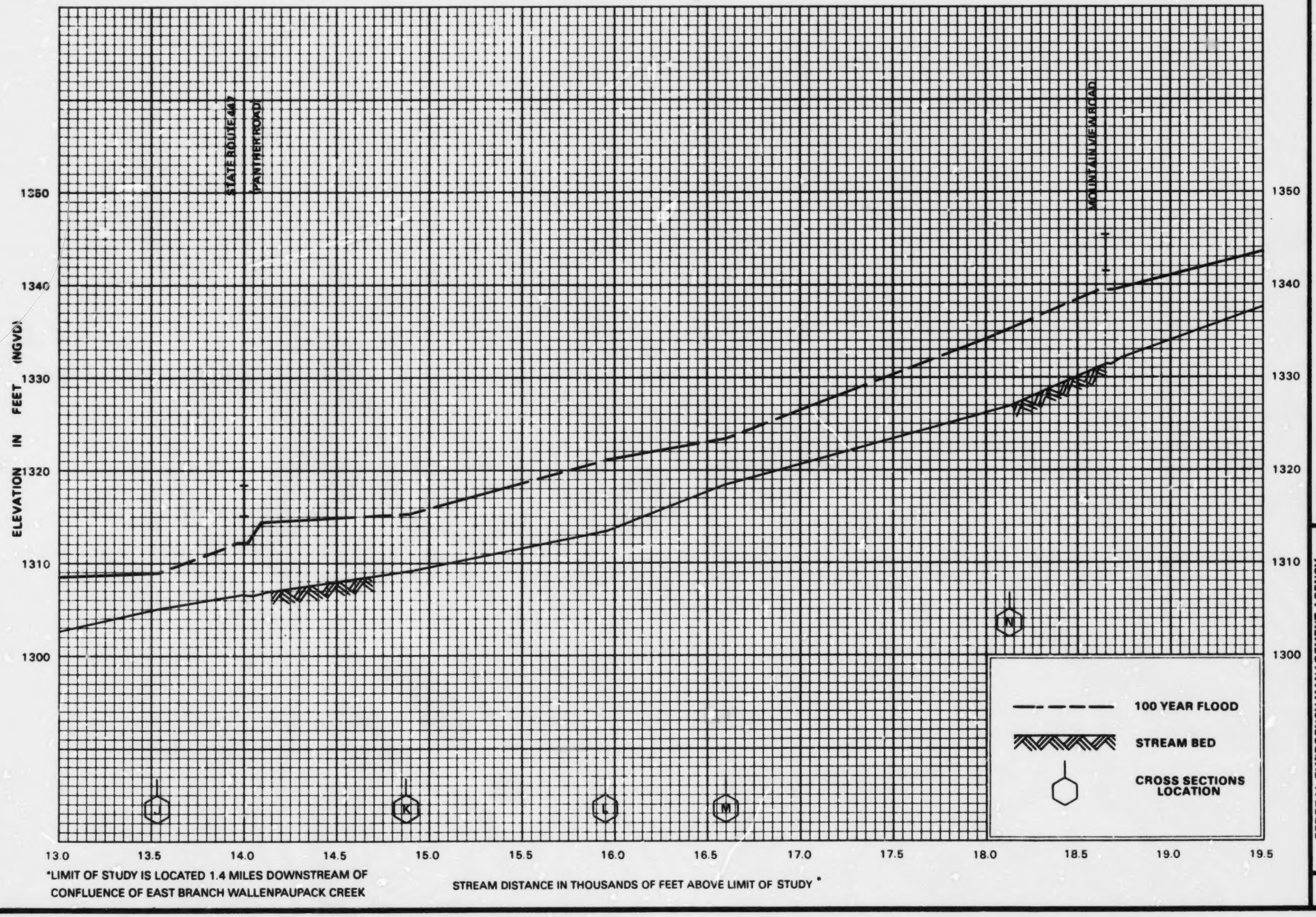
FLOOD PROFILES

WALLENPAUPACK CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

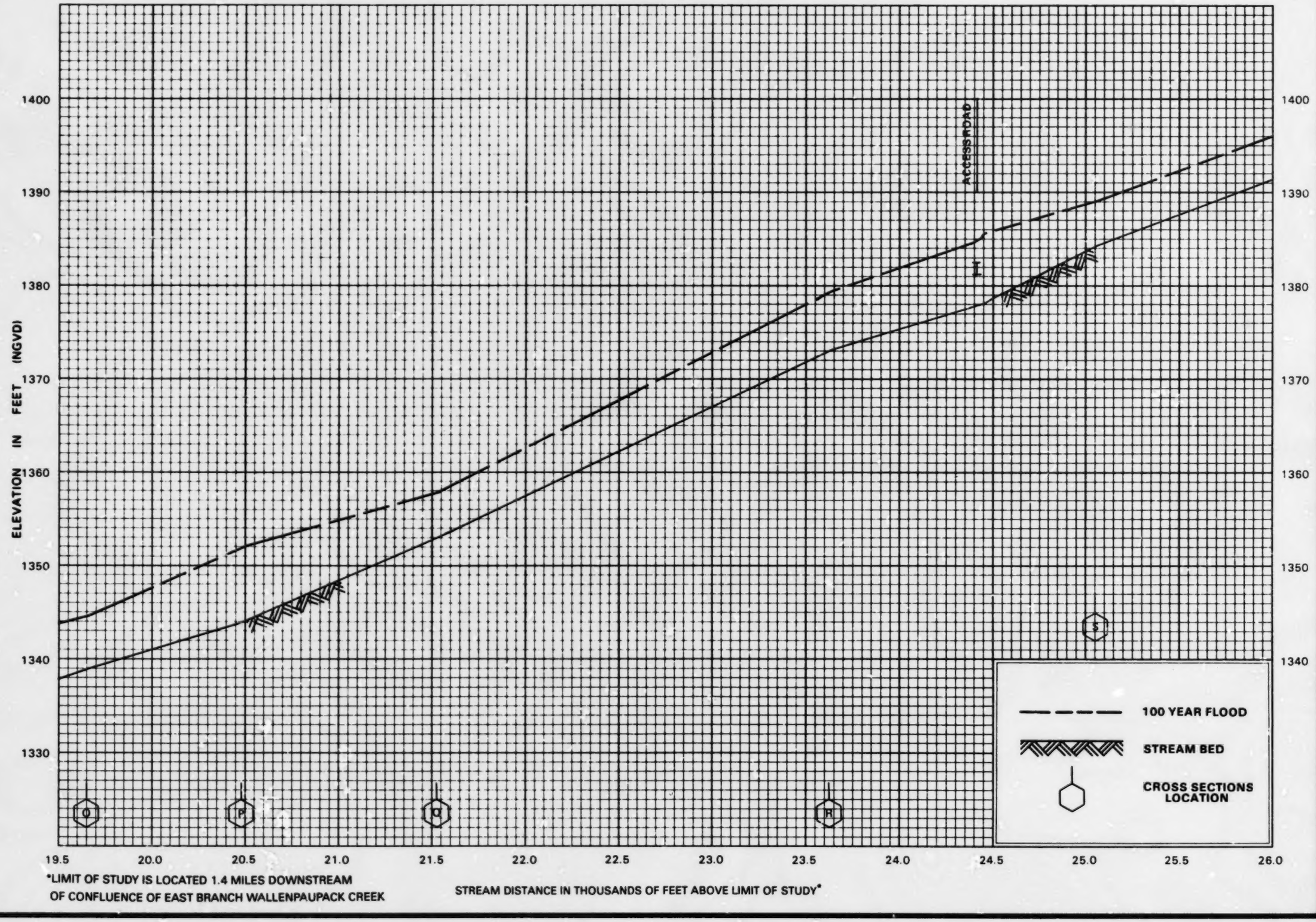
TOWNSHIP OF GREENE, PA

(PIKE CO.)



*LIMIT OF STUDY IS LOCATED 1.4 MILES DOWNSTREAM OF CONFLUENCE OF EAST BRANCH WALLENPAUPACK CREEK

05P



FLOOD PROFILES

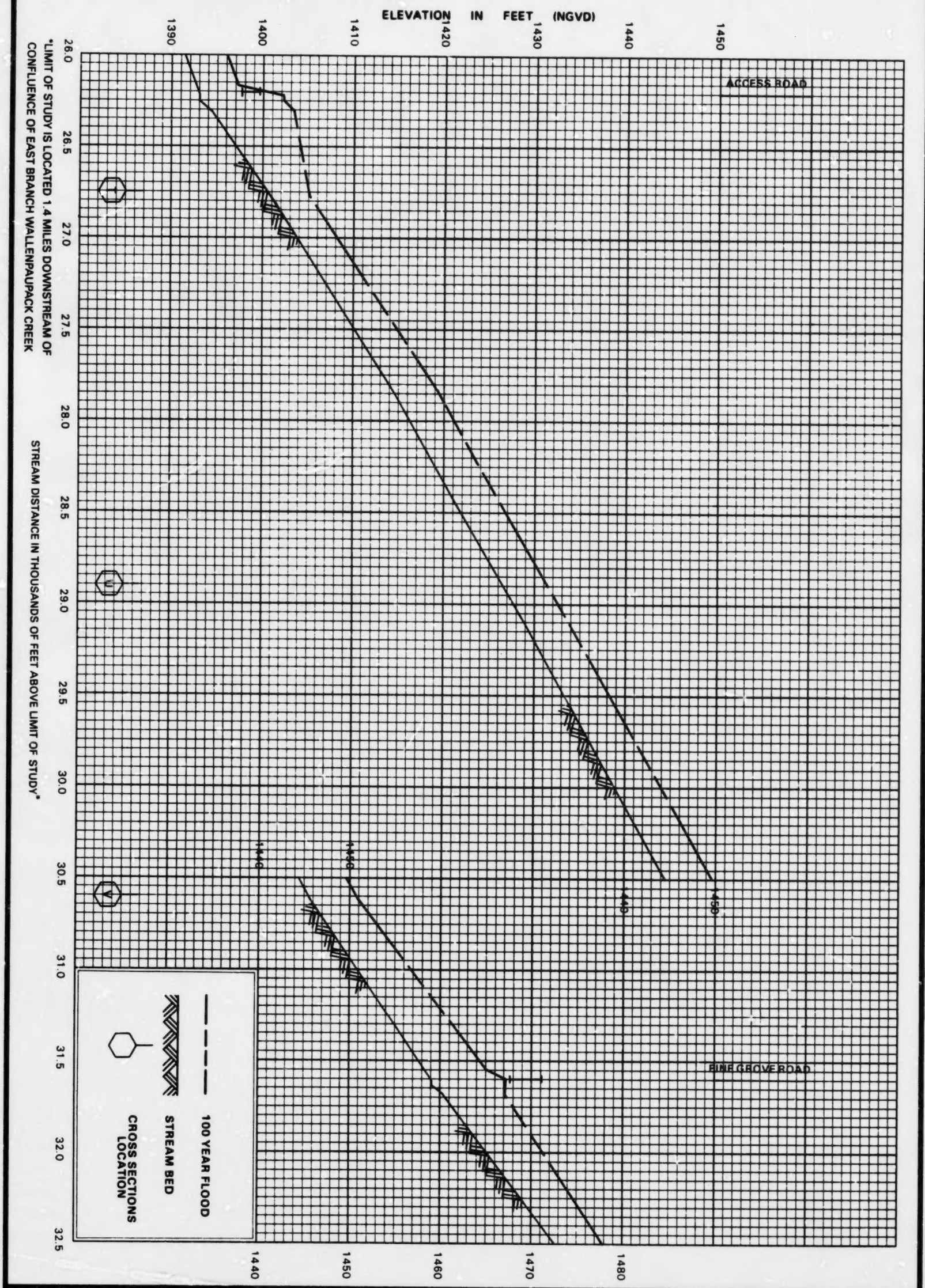
WALLENPAUPACK CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWNSHIP OF GREENE, PA

(PIKE CO.)

06P



FEDERAL EMERGENCY MANAGEMENT AGENCY

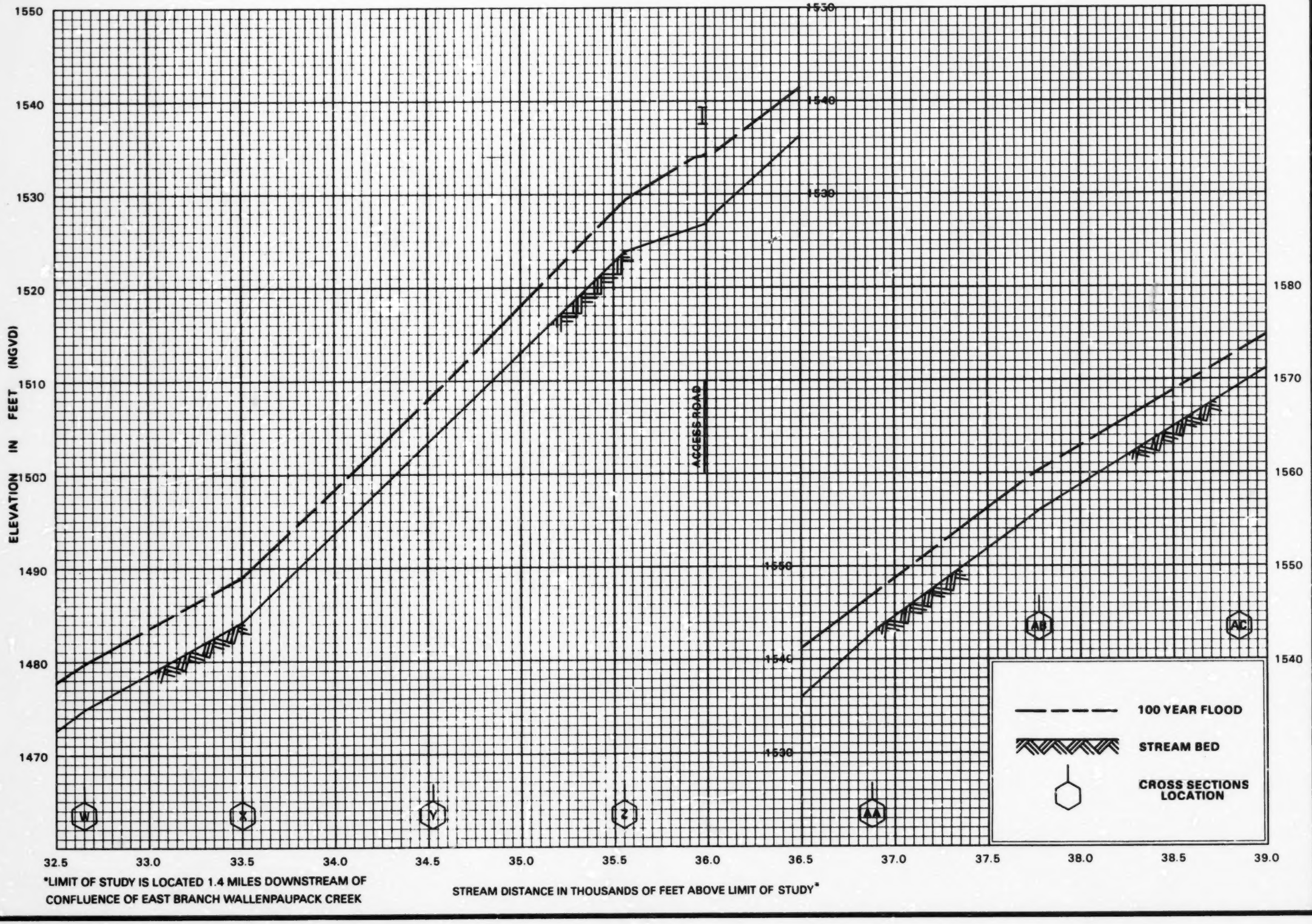
TOWNSHIP OF GREENE, PA

(PIKE CO.)

07P

FLOOD PROFILES

WALLENPAUPACK CREEK



FLOOD PROFILES

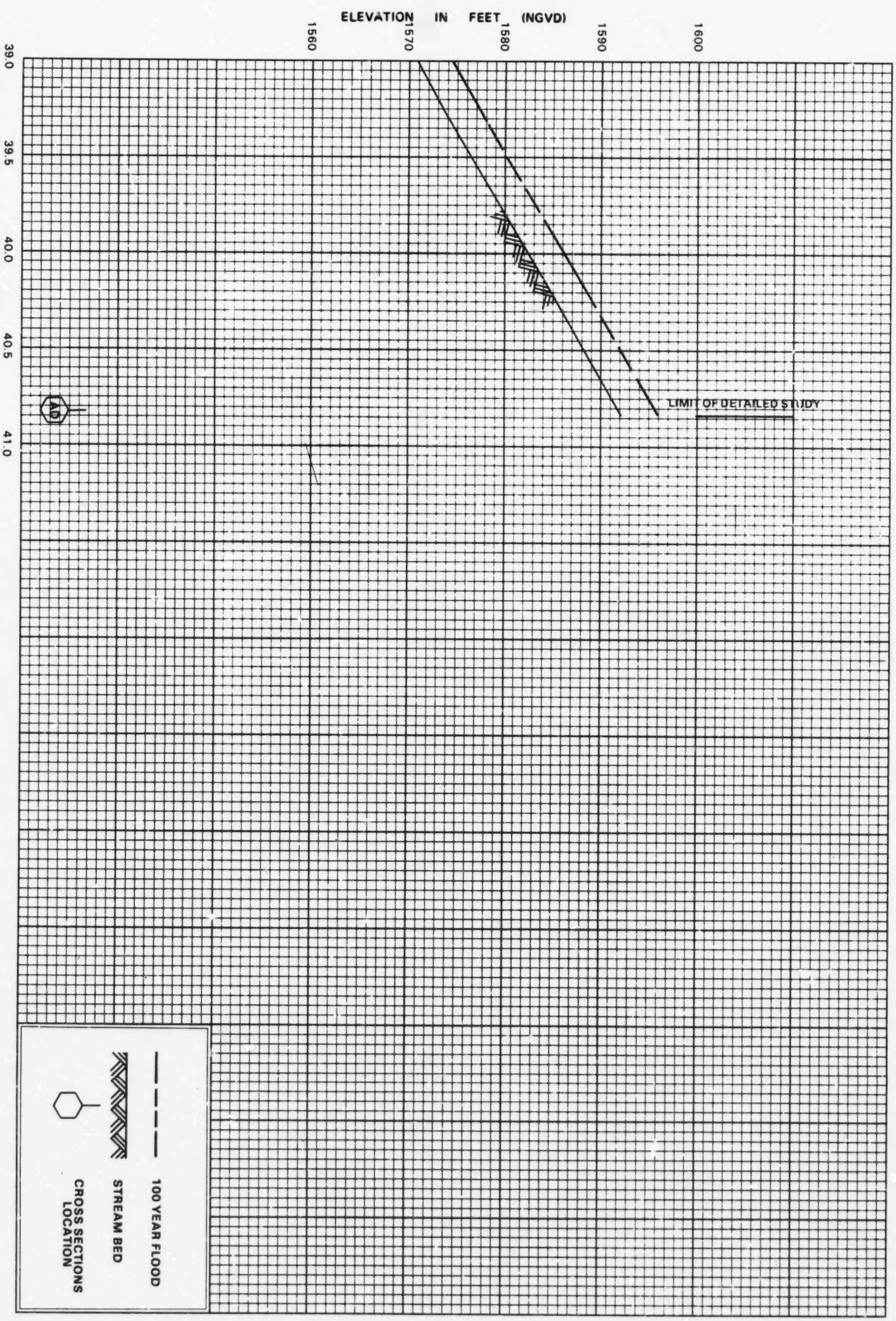
WALLENPAUPACK CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWNSHIP OF GREENE, PA

(PIKE CO.)

08P



09P

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWNSHIP OF GREENE, PA

(PIKE CO.)

FLOOD PROFILES

WALLENPAUPACK CREEK